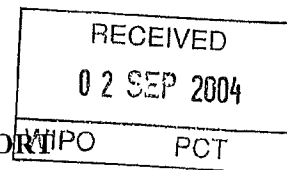


PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference VS:CE:FP18630	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).	
International Application No. PCT/AU2003/001373	International Filing Date (day/month/year) 16 October 2003	Priority Date (day/month/year) 16 October 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ A61K 38/08, 38/12, A61P 19/02		
Applicant THE UNIVERSITY OF QUEENSLAND et al		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 3 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p style="padding-left: 40px;">These annexes consist of a total of 3 sheet(s).</p>	
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 	

Date of submission of the demand 14 May 2004	Date of completion of the report 24 August 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer <div style="text-align: center; margin-top: 20px;"> G.R. PETERS Telephone No. (02) 6283 2184 </div>

International application No.
PCT/AU2003/001373

1. With regard to the elements of the international application:

- ☐ the international application as originally filed.
- ☒ the description, pages 1-32, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages 33-35, received on 12 August 2004 with the letter of 11 August 2004
- ☒ the drawings, pages 1/6-6/6, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

☐ contained in the international application in written form.

- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.

- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

<input type="checkbox"/>	the description,	pages
<input type="checkbox"/>	the claims,	Nos.
<input type="checkbox"/>	the drawings,	sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report**

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1-16	YES
	Claims	NO
Inventive step (IS)	Claims 1-16	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-16	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The claims are now limited to the use of compounds of formula I and are thus considered to be novel and in compliance with article 33(2) of the PCT.

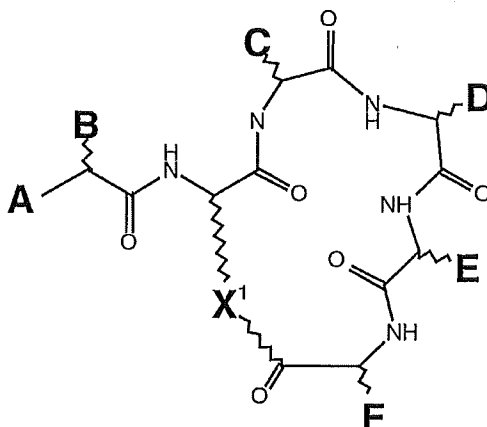
Claims 1- 16 also involve an inventive step as none of the citations disclose or suggest that G-protein coupled receptors as a class, have any utility in the treatment of osteoarthritis. Thus the claims comply with article 33(3) of the PCT.

The industrial applicability of the claims is not in doubt.

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CLAIMS

1. A method of treatment of osteoarthritis,
comprising the step of administering an effective amount
5 of an inhibitor of a G protein-coupled receptor to a
subject in need of such treatment, in which the inhibitor
is a compound which
(a) is an antagonist of a G protein-coupled receptor,
(b) has substantially no agonist activity, and
10 (c) is a cyclic peptide or peptidomimetic compound of
formula I



- 15 where A is H, alkyl, aryl, NH₂, NH-alkyl,
N(alkyl)₂, NH-aryl, NH-acyl, NH-benzoyl, NHSO₃, NHSO₂-
alkyl, NHSO₂-aryl, OH, O-alkyl, or O-aryl;
B is an alkyl, aryl, phenyl, benzyl, naphthyl or
20 indole group, or the side chain of a D- or L-amino acid,
but is not the side chain of glycine, D-phenylalanine, L-
homophenylalanine, L-tryptophan, L-homotryptophan, L-
tyrosine, or L-homotyrosine;
C is the side chain of a D-, L- or homo-amino
25 acid, but is not the side chain of isoleucine,
phenylalanine, or cyclohexylalanine;
D is the side chain of a neutral D-amino acid,
but is not the side chain of glycine or D-alanine, a bulky
planar side chain, or a bulky charged side chain;

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E is a bulky substituent, but is not the side chain of D-tryptophan, L-N-methyltryptophan, L-homophenylalanine, L-2-naphthyl L-tetrahydroisoquinoline, L-cyclohexylalanine, D-leucine, L-fluorenylalanine, or
5 L-histidine;

F is the side chain of L-arginine, L-homoarginine, L-citrulline, or L-canavanine, or a bioisostere thereof; and

X is $-(CH_2)_nNH-$ or $(CH_2)_nS-$, where n is an
10 integer of from 1 to 4; $-(CH_2)_2O-$; $-(CH_2)_3O-$; $-(CH_2)_3-$; $-(CH_2)_4-$; $-CH_2COCHRNH-$; or $-CH_2-CHCOCHRNH-$, where R is the side chain of any common or uncommon amino acid.

2. A method according to claim 1, in which n is 2 or
3.

15 3. A method according to claim 1 or claim 2, in which A is an acetamide group, an aminomethyl group, or a substituted or unsubstituted sulphonamide group.

4. A method according to claim 3, in which A is a substituted sulphonamide, and the substituent is an alkyl
20 chain of 1 to 6 carbon atoms, or a phenyl or tolyl group.

5. A method according to claim 4, in which the substituent is an alkyl chain of 1 to 4 carbon atoms.

6. A method according to any one of claims 1 to 5, in which B is the side chain of L-phenylalanine or L-
25 phenylglycine.

7. A method according to any one of claims 1 to 6, in which C is the side chain of glycine, alanine, leucine, valine, proline, hydroxyproline, or thioproline.

8. A method according to any one of claims 1 to 7,
30 in which D is the side chain of D-Leucine, D-homoleucine, D-cyclohexylalanine, D-homocyclohexylalanine, D-valine, D-norleucine, D-homo-norleucine, D-phenylalanine, D-tetrahydroisoquinoline, D-glutamine, D-glutamate, or D-tyrosine.

35 9. A method according to any one of claims 1 to 8, in which E is the side chain of an amino acid selected from the group consisting of L-phenylalanine, L-tryptophan

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and L-homotryptophan, or is L-1-naphthyl or L-3-benzothienyl alanine.

10. A method according to any one of claims 1 to 9, in which the inhibitor is a compound which has antagonist
5 activity against C5aR, and has no C5a agonist activity.

11. A method according to any one of claims 1 to 10, in which the inhibitor has potent antagonist activity at sub-micromolar concentrations.

12. A method according to any one of claims 1 to 11,
10 in which the compound has a receptor affinity $IC_{50} < 25\mu M$, and an antagonist potency $IC_{50} < 1\mu M$.

13. A method according to any one of claims 1 to 12, in which the compound is selected from the group consisting of compounds 1 to 6, 10 to 15, 17, 19, 20, 22,
15 25, 26, 28, 30, 31, 33 to 37, 39 to 45, 47 to 50, 52 to 58 and 60 to 70 described in PCT/AU02/01427.

14. A method according to claim 13, in which the compound is compound 1 (AcF-[OP-DCha-WR]), compound 33 (AcF-[OP-DPhe-WR]), compound 60 (AcF-[OP-DCha-FR]) or
20 compound 45 (AcF-[OP-DCha-WCit]) described in PCT/AU02/01427.

15. A method according to any one of claims 1 to 14, in which the inhibitor is used in conjunction with one or more other agents for the treatment of osteoarthritis.

25 16. Use of a compound as defined in any one of claims 1 to 14 in the manufacture of a medicament for the treatment of osteoarthritis.